UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/587,076	06/02/2000	Bernard Traversat	5181-46700 P4453	7303

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EXAMINER
CHEN, CHONGSHAN

ART UNIT	PAPER NUMBER
2172	

DATE MAILED: 07/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/587,076	TRAVERSAT ET AL.
	Examiner	Art Unit
	Chongshan Chen	2172

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *19 April 2004*.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-56* is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) *1-56* is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a) ☐ All b) ☐ Some * c) ☐ None of:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____.
      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date *5, 6, 7, 9, 11*.
4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1.   This action is responsive to communication filed on 19 April 2004. Claims 1-56 are

pending in this Office Action.

Specification

2.   The abstract of the disclosure is objected to because the abstract exceeds 150 words.

Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

4.   This application currently names joint inventors. In considering patentability of the

claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

claims was commonly owned at the time any inventions covered therein were made absent any

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c)

and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5.   Claims 1-12, 15-27, 30-40, 43-53 and 56 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Aman et al. ("Aman", 6,694,346) in view of Knudsen (5,682,535).

As per claim 1, Aman teaches a method for managing a virtual heap for a process

executing within a virtual machine executing within a device, the method comprising:

providing a store heap for the process, wherein the store heap is comprised in the virtual

heap (Aman, Fig. 3 & 4);

providing an in-memory heap for the process, wherein the in-memory heap comprises a

cached portion of the store heap for the process, and wherein the in-memory heap is comprised

in the virtual heap (Aman, Fig. 3 & 4);

performing an atomic transaction on the virtual heap, wherein said performing the atomic

transaction comprises performing one or more transaction tasks, and wherein said performing the

atomic transaction changes a state of the virtual heap by modifying one or more portions of the

virtual heap (Aman, col. 4, lines 10-13).

Aman does not explicitly disclose committing the atomic transaction by accepting the

modifications to the one or more portions of the virtual heap if the one or more transaction tasks

in the atomic transaction are performed without generating an error; and rejecting the atomic

transaction by restoring the virtual heap to the state of the virtual heap prior to said performing

the atomic transaction if one or more of the one or more transaction tasks in the atomic

transaction generates an error when performed.

Knudsen discloses committing the atomic transaction by accepting the modifications to

the one or more portions of the virtual heap if the one or more transaction tasks in the atomic

transaction are performed without generating an error; and rejecting the atomic transaction by

restoring the virtual heap to the state of the virtual heap prior to said performing the atomic

transaction if one or more of the one or more transaction tasks in the atomic transaction generates

an error when performed (Knudsen, col. 14, lines 46-48).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the

invention was made to include COMMIT and ROLLBACK functions in the system of Aman in

order to handle the transaction errors and restore the system to a correct state.

As per claim 2, Aman and Knudsen teach all the claimed subject matters as discussed in

claim 1, and further teach wherein an access state of the store heap is closed prior to said

performing the atomic transaction, and wherein the closed access state prohibits performing the

atomic transaction; the method further comprising: changing the access state of the store heap to

open prior to said performing the atomic transaction, wherein the open access state permits said

performing the atomic transaction (Aman, col. 4, lines 10-13, Knudsen, col. 65, lines 8-22, col.

67, lines 46-52).

As per claim 3, Aman and Knudsen teach all the claimed subject matters as discussed in

claim 2, and further teach changing the access state of the store heap to closed subsequent to said

performing the atomic transaction (Aman, col. 4, lines 10-13, Knudsen, col. 65, lines 8-22, col.

67, lines 46-52).

As per claim 4, Aman and Knudsen teach all the claimed subject matters as discussed in

claim 1, and further teach wherein the atomic transaction is an atomic write transaction (Aman,

col. 4, lines 10-13); and wherein said performing the atomic transaction comprises: reading a

first portion of the in-memory heap; and writing the first portion of the in-memory heap to the

store heap (Aman, col. 4, lines 10-13).

As per claim 5, Aman and Knudsen teach all the claimed subject matters as discussed in claim 4, and further teach verifying that the first portion of the in-memory heap is successfully read from the in-memory heap prior to said writing the first portion of the in-memory heap to the store heap (Aman, col. 4, lines 10-13).

As per claim 6, Aman and Knudsen teach all the claimed subject matters as discussed in claim 4, and further teach deleting the first portion from the in-memory heap subsequent to said reading the first portion from the in-memory heap (Knudsen, col. 12, lines 65-67).

As per claim 7, Aman and Knudsen teach all the claimed subject matters as discussed in claim 1, and further teach wherein the atomic transaction is an atomic read transaction (Aman, col. 4, lines 10-13); and wherein said performing the atomic transaction comprises: reading a second portion of the store heap; and writing the second portion of the store heap to the in-memory heap (Aman, col. 4, lines 10-13).

As per claim 8, Aman and Knudsen teach all the claimed subject matters as discussed in claim 7, and further teach verifying that the second portion of the store heap is successfully read from the store heap prior to said writing the first portion of the store heap to the in-memory heap (Aman, col. 4, lines 10-13).

As per claim 9, Aman and Knudsen teach all the claimed subject matters as discussed in claim 1, and further teach wherein the atomic transaction is an atomic delete transaction; and wherein said performing the atomic transaction comprises: deleting a third portion of the store heap (Knudsen, col. 12, lines 65-67).

As per claim 10, Aman and Knudsen teach all the claimed subject matters as discussed in claim 1, and further teach checkpointing the store heap to a persistent store to make the virtual heap persistent (Knudsen, col. 69, line 10).

As per claim 11, Aman and Knudsen teach all the claimed subject matters as discussed in claim 1, and further teach wherein the store heap is one of a plurality of store heaps in a persistent store; wherein each of the plurality of store heaps is associated with one of a plurality of processes; and wherein the process is one of the plurality of processes (Aman, Fig. 3 & 4).

As per claim 12, Aman and Knudsen teach all the claimed subject matters as discussed in claim 1, and further teach wherein the store heap and the in-memory heap are comprised in one memory address space (Aman, Fig. 3 & 4).

As per claim 15, Aman and Knudsen teach all the claimed subject matters as discussed in claim 1, and further teach wherein the in-memory heap and the store heap comprise objects for the process, and wherein the objects comprise code and data for use by the process during execution within the virtual machine (Aman, Fig. 3 & 4, col. 2, lines 38-67).

As per claim 16, Aman teaches a method for managing a virtual heap on a virtual machine executing within a device, the method comprising:

providing a store heap for a first process executing within the virtual machine, wherein the store heap is comprised in the virtual heap (Aman, Fig. 3 & 4);

providing an in-memory heap for the first process, wherein the in-memory heap comprises a cached portion of the store heap for the first process, and wherein the in memory heap is comprised in the virtual heap (Aman, Fig. 3 & 4);

performing heap operations on the virtual heap (Aman, col. 4, lines 10-13);

a second process calling a first function to perform a first operation on a first portion of the virtual heal; performing the first operation on the first portion of the virtual heap in response to the second process calling the first function, wherein said performing the first operation changes a state of the virtual heap by modifying the first portion of the virtual heap (Aman, col. 4, lines 10-13).

Aman does not explicitly disclose providing an application programming interface (API). Knudsen discloses providing an application programming interface (API) (Knudsen, col.4, lines 2-5). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include an API in the system of Aman in order to provide an interface between the virtual machine and the data storage systems.

Aman does not explicitly disclose committing the first operation on the first portion of the virtual heap by accepting the modifications to the first portion of the virtual heap if the first operation is performed without generating an error; and rejecting the first operation on the first portion of the virtual heap by restoring the virtual heap to the state of the virtual heap prior to said performing the first operation if the first operation generates an error when performed.

Knudsen discloses committing the first operation on the first portion of the virtual heap by accepting the modifications to the first portion of the virtual heap if the first operation is performed without generating an error; and rejecting the first operation on the first portion of the virtual heap by restoring the virtual heap to the state of the virtual heap prior to said performing the first operation if the first operation generates an error when performed (Knudsen, col. 14, lines 46-48).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include COMMIT and ROLLBACK functions in the system of Aman in order to handle the transaction errors and restore the system to a correct state.

As per claim 17, Aman and Knudsen teach all the claimed subject matters as discussed in claim 16, and further teach the first process and the second process are the same process (Aman, Fig. 3 & 4).

As per claim 18, Aman and Knudsen teach all the claimed subject matters as discussed in claim 16, and further teach the second process is a heap management process (Aman, Fig. 3 & 4).

Claims 19-27 are rejected on grounds corresponding to the reasons given above for claims 4-12.

Claims 30-31 are rejected on grounds corresponding to the reasons given above for claims 15-16.

Claims 32-40 are rejected on grounds corresponding to the reasons given above for claims 2-12.

Claim 43 is rejected on grounds corresponding to the reasons given above for claim 15.

Claims 44-53 are rejected on grounds corresponding to the reasons given above for claims 1-12.

Claim 56 is rejected on grounds corresponding to the reasons given above for claim 15.

6.   Claims 13-14, 28-29, 41-42 and 54-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aman et al. ("Aman", 6,694,346) in view of Knudsen (5,682,535) and further in view of Lawrence (6,629,113).

As per claim 13, Aman and Knudsen teach all the claimed subject matters as discussed in claim 1, except for explicitly disclosing wherein the device is a mobile computing device. Lawrence teaches the device is a mobile computing device (Lawrence, col. 4, lines 60-63). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a mobile computing device in order to allow the user to use the system anywhere.

As per claim 14, Aman and Knudsen teach all the claimed subject matters as discussed in claim 1, except for explicitly disclosing wherein the virtual machine is a Java virtual machine; and wherein the process is a Java application. Lawrence teaches the virtual machine is a Java virtual machine; and wherein the process is a Java application (Lawrence, col. 1, lines 15-65). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use Java platform because Java is portable and Java program can be run on different systems.

Claims 28-29, 41-42 and 54-55 are rejected on grounds corresponding to the reasons given above for claims 13-14.

Response to Arguments

7.   Applicant's arguments with respect to claims 1-56 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

Doty et al. (5,751,613) disclose persistent heap for dynamic picture objects.

Venkatesh et al. (6,256,637) disclose transactional virtual machine architecture.

Gupta (5,822,590) discloses a persistent programming language model.

Jordan (6,094,528) discloses a method and apparatus for system building with a

transactional interpreter.

Contact Information

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Chongshan Chen whose telephone number is 703-305-8319. The

examiner can normally be reached on Monday - Friday (8:00 am - 4:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, John E Breene can be reached on (703)305-9790. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

July 8, 2004

SHAHID ALAM
PRIMARY EXAMINER